

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/11/09 has been entered.

### ***Claim Objections***

2. Claim 2 is objected to because of the following informalities: The word "dispersed" should be omitted from the claim language. Upon further consideration, it has been noted that this phase can either be dispersed or the majority phase. In the situation where the content of this phase is over 50% and at the extreme, 98%, this adjective becomes troublesome and causes internal conflict in the definition of the applicant's invention. It is advised that this word be removed, as in its absence, the claim retains the desired meaning without the inconsistencies introduced by the term.. Appropriate correction is required.

Art Unit: 1793

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2,10-12,14-16,19,20,22-26,28-30, 37, 40 and 42 *are* rejected under 35 U.S.C. 103(a) as being unpatentable over Barrera in 2004/0029706.

Art Unit: 1793

**Regarding Claim 2:** Barrera teaches a composite consisting of nanostructured carbon materials and a ceramic material. Specifics of the ceramic phase are revealed at paragraph 48. It is stated that a variety of ceramic phases can be used to produce the body including silicon carbide, silicon nitride, tantalum carbide, among others. These phases are added in the form of powders in the size range of from 10-1000 nm.

In terms of the nanostructured carbon materials, Barrera teaches that fullerene molecules are suitable (See Paragraph 40). Fullerenes typically have a size of 7 angstroms. Furthermore, at paragraph 52, Barrera teaches that these fullerenes can be used in an amount up to 50 wt%.

Therefore, Barrera teaches a range of compositions, which represent an overlapping range with those of the claims. One of ordinary skill would arrive at the claimed invention by selecting from this overlapping range and would then arrive at a composition suitable, as was determined by Barrera. Overlapping ranges have been found to create a prima facie case of obviousness. See MPEP 2144.05.

**Regarding Claim 10:** Barrera teaches that his composite (as described above in "Regarding Claim 2") can be made by several means as described in paragraphs 43-46. The method begins by creating a slurry comprising the ceramic powders and adding the fullerenes to this slurry. This slurry is then formed into a green body of a specific shape (i.e. molded). Finally the product is sintered at between 500-2500C and

Art Unit: 1793

at a pressure as much as **about**  $1E^6$  torr. The claims currently refer to a minimum pressure of about  $1.5E^6$  torr. Pressures of  $1.5E^6$  are deemed to be about  $1E6$  torr as stated by Barrera and thus obvious over his teachings. See MPEP 2144.05.

Furthermore, Barrera teaches non-oxidizing atmospheres in paragraph 46, including Argon, Nitrogen, etc.

**Regarding Claim 11-12:** Barrera teaches that the powdery ceramic phase used in the method of making his product can be of various carbides and nitrides including those containing Al, Si, Ti, Zr, and Ta (See Paragraph 48).

**Regarding Claim 14 and 29:** Barrera teaches that the as produced product can be manufactured to have a minimum porosity of at least about 1% (see paragraph 53).

**Regarding Claim 15 and 30:** The product as created by Barrera is of essentially the same composition as that of the claims. Furthermore, it is made of extremely hard ceramics such as tungsten carbide, silicone carbide, or tantalum carbide in conjunction with fullerenes. Therefore, it would be found that the highly sintered body of these materials would necessarily have a hardness of at least 10 GPa.

**Regarding Claim 16, 19-20, 22-26, 28:** Barrera teaches that the powdery ceramic phase used in his product can be of various carbides and oxides including those containing Al, Si, Ti, Zr, and Ta (See Paragraph 48).

**Regarding Claim 37, 40, and 42:** Barrera teaches that suitable compositions for the ceramic include silicon carbide, silicon nitride and tantalum carbide(See Paragraph 48).

***Allowable Subject Matter***

7. Claims 33-34, and 38, and 41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The prior art made of reference does not anticipate or make obvious the use of graphite as the carbonaceous phase. Barrera for example only uses nanostructured carbon, which he defines as fullerene-type materials e.g. nanotubes, nano-onions, fullerenes, etc. Furthermore, the prior art does not anticipate or make obvious high pressures such as those seen in Claims 33-34. Barrera only teaches pressures up to about 1E6 torr. Furthermore, in reference to art previously made of record in past office actions, diamond composites and composites with larger phase sizes were taught. Therefore, these claims would be allowable if rewritten in the independent form whilst including the limitations of the base claim and all intervening claims.

### ***Response to Arguments***

9. Applicant's arguments with respect to claim 2 and 10 have been considered but are moot in view of the new ground(s) of rejection. The arguments are based on the art previously applied and focus on the use of diamond in the composite. The claims no longer include diamond as a possible component as the carbon-allotrope. Thus these references no longer anticipate or make obvious the instant claims. The newly applied art does not include diamond and instead uses fullerenes as a carbonaceous phase.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following articles are seen as applicable to the instant claims, but teach cumulatively less than that of the cited art. See the paper by Ioroi entitled "Platinum and molybdenum oxide deposited carbon electrocatalyst for oxidation of hydrogen containing carbon monoxide" and the paper by Kim entitled "Characterization of hydrous ruthenium oxide/carbon nanocomposite supercapacitors prepared by a colloidal method." These papers describe graphite/oxide nanocomposite catalysts that are applicable to at least claim 2. Their review should be taken into consideration when a response is made. Although the claims aren't immediately rejected based upon them, since the art of reference teaches much more than these two papers alone or in combination.

Art Unit: 1793

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENZO/  
Supervisory Patent Examiner, Art Unit 1793

meh